renovation nation

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Green building interview, part I

Tyson Domer, principal of Artisan designBuild, is on the move. Literally. He's currently relocating to Indianapolis, but has completed green building projects in Seattle through his own firm and previously as lead carpenter on several projects for JAS Design Build, local experts at incorporating salvaged and other green building materials. The following is Part I of an interview with Tyson, who shares insight and tips on green building from the General Contractor perspective.

How would you define "green?"

Green=sustainable=planning for the future. For me, green building is all about planning for the future, from the future needs of my clients to the future of our planet. Many residential renovation projects, "green" or otherwise, suffer from a lack of planning. Prior planning is essential to a successful green building project, starting with the design and specifications and continuing through construction. Green design takes the present as well as future needs of the client into consideration during the design process. A common example is the implementation of "universal design" principles when planning living spaces. Green designers should also try to plan for future disassembly of a home, a concept known as 'design for deconstruction'. Specifying mechanical fasteners in place of adhesives, for example, facilitates salvage and reuse of materials in subsequent remodels and cuts down on VOC (Volatile Organic Content) emissions to boot.

For me, green building is about planning for the future.

Green designers and builders should also be able to specify materials and finishes that utilize renewable resources and contain less embodied energy in the manufacture and delivery of the products. Green products are designed to leave a smaller ecological footprint. By keeping the quality of materials and workmanship high, premature construction failures can be avoided. I think all residential builders should build as if their projects will be around for 100 years anyway.

How do you apply this to your own projects?

We put a lot of energy into design and planning before even thinking about cutting lumber or driving nails. In addition to baseline green building strategies, like managing our construction waste stream to maximize reuse and recycling, our planning process helps identify other areas where we can achieve green. Going into the build phase with a solid design and specification also makes it easier to take advantage of any opportunities that present themselves as construction progresses.

I'm a fan of Sarah Susanka (*The Not so Big House,* Taunton Press, 2001) and I believe that a fair number of people considering a room addition or bump out are better served by reorganizing their existing space to satisfy their needs. It's the ultimate reuse, and smart design and planning are the keys to making it work. We have created master suites in attics, and ADUs (Accessory Dwelling Units, often called "Mother in Law" apartments) in basements. We like to capture wasted space above and below stairwells for pantries, built-in seating and appliances. Renovation is an inherently more efficient use of existing resources than new construction.

What are some of the challenges associated with remodeling, rather than building new?

When renovating, you are stuck with the original solar orientation of a building on its site. One of our projects involved a home with massive amounts of glazing on the south and east faces. Our solution was to design and install solar shading elements (that also serve double duty as a kitchen garden window and trellis for an evergreen clematis) and replace the single glazed windows and doors with insulated low-E (coatings that let in light while reducing heat buildup) units. We also specified adjustable cellular shades which both reflect solar heat and insulate while admitting lots of light. The result: living spaces are cooler in the summer and retain more heat during the winter without compromising views or natural light. The solutions are simple, but the design and implementation require an understanding of the underlying concepts.

Tune in next month for more from Tyson Domer.

September 2005 Inside:

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This newsletter can be made available on request to accommodate people with disabilities and those who need language translation assistance.
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Events & educational opportunities

9/28 (Wed), 6:30–9 p.m.: 10x10x10 Green Design Slam. Join the Northwest EcoBuilding Guild for this fast-paced evening of presentations. See ten presenters show ten slides each of their favorite recent green project. Admission is (you guessed it) ten dollars. This year, the event will be at the Environmental Home Center. To find out more, see the Seattle chapter of the Guild's website at **www.ecobuilding.org**.

9/29 (Thur), 7 p.m.: Environmental Film Night at Camp Long Environmental Learning Center. Showing: "**Blue Vinyl**." This Emmy Award-winning documentary is part activist's journey, part comedy, and part detective story. See one woman's journey to discover the implications of her parents' decision to install vinyl siding on their home. See **www.nweec.org** for details.

10/1 (Sat) Solar and Green Building Tour. See real homes in Seattle that incorporate solar electric and solar hot water systems, along with other green building elements. See **www.solarwashington.org/Tour/SolarTour.htm** for more information.

Get involved!

Architects Without Borders Seattle heads to Mississippi—you can help! News of the social, economic, and physical devastation caused by Hurricane Katrina abounds. Assistance is needed on multiple fronts to address this disaster, including the help of building professionals. The Seattle Chapters of the American Institute of Architects (AIA) and Architects Without Borders is sending design professionals to Mississippi to help with damage assessment of the areas buildings, focusing structures critical to providing services and assistance to area residents. Visit **www.aiaseattle.org** to learn more about the effort, and make a donation to help the effort.

Explore the Green Seattle Guide

The Green Seattle Guide at is a guide to community action, featuring a list of 101 eco actions for you and your family to help protect our urban environment. The guide also offers a wealth of resources including websites, publications and volunteer opportunities. Check it out; share it with family, friends and neighbors. Find it at **www.seattle.gov/environment**. The more you and others use the guide, the healthier Seattle will be, for us and future generations.

Green home Q&A

Q: *We're planning on replacing our three-tab shingle roof, and want to make sure we're picking a color that won't heat up the home too much in the summer. Do you have any suggestions on what color to choose?*

A: According to the Energy Star® program (see **www.energystar.gov**), Americans spend $40 *billion* on air conditioning buildings. And according to the US Department of Energy, one-third of the unwanted heat that builds up in your home comes from your roof. Even in the relatively temperate Pacific Northwest, a dark asphalt shingle roof, especially when combined with insufficient insulation in the attic, can quickly make a home uncomfortably warm on sunny summer days.

Roofing material selection can have a large impact on unwanted heat gain. The Florida Solar Energy Center conducted tests that showed roofs using reflective roofing materials can reduce attic temperatures by 30° F. Interestingly, studies have shown that in general, the color of an asphalt shingle roof doesn't make a huge difference in the amount that a roof heats up—most are very efficient at overheating your roof. Even asphalt shingles with light-colored granules on the surface layer still tend to absorb 80% of the energy that strikes them. Black shingles can absorb up to 95% of that energy.

Increasing insulation can help with unwanted heat gain from asphalt roofing products. Or, consider alternatives to asphalt roofing products. The Energy Star program lists roofing materials that meet their criteria for reflectance, as well as durability and other performance factors. Energy Star qualified metal roofs are available in a variety of styles, including shingle, shake, and slate look-alikes.

All that said, there may be times when it's desirable to *increase* the amount of heat your roof generates. A new system captures this heat for water or space heating purposes. The system consists of a network of liquid-filled tubing placed below conventional standing-seam metal roofing material. As the liquid circulates, it picks up heat from the roofing. This heat is transferred to incoming cold water to preheat household water or an in-floor or radiant hot water heating system. See **www.dawnsolar.com** for more information on this system.

Have a green remodeling question of your own? Let us do the research for you! Email questions to: **greenhome@seattle.gov**

CASE STUDY:
Natural wall finishes

OWNERS: The Direden Family
ARCHITECT: Living Shelter Design
GENERAL CONTRACTOR: The Construction Company
WALL FINISHES: Catherine Burke
LOCATION: Redmond, WA

Lighter colored surfaces create bright spaces that don't need supplemental artificial light.

Surfaces change color with the shifting sunlight.

Earthen plaster can be applied with any desired texture. The owners wanted a hand-applied look.

Standard interiors of gypsum wallboard and paint can leave a homeowner yearning for natural surfaces to see and touch. And many exterior finishes are environmentally problematic, whether it's a concern over the safety of plastic materials like PVC or the durability and environmental impact of wood materials. The last decade has seen a reawakening to the allure of natural wall finishes. These finishes consist of clays, sand, pigments, straw and other natural materials. These finishes are centuries (and in some cases, millennia) old, and can coexist in exciting ways with diverse architectural and interior styles. Many can be applied over a variety of substrates, from bales of straw to drywall.

Catherine Burke is natural building pioneer in the Pacific Northwest. She is part of a group of natural builders refining natural plaster techniques and materials for a full spectrum of uses. Catherine and the group mixed and applied the interior and exterior plaster work on this project, located in Redmond. The project also features a variety of green building elements, including rainwater harvest, advanced framing techniques that save lumber, and a geothermal heating system—a system that takes advantage of the stable temperature of the soil beneath the site to help heat the home.

The walls of this home are Durisol, an insulated concrete forming system consisting of units that resemble oversized concrete blocks. Made from mineralized wood chips and Portland cement, the blocks are stacked and then the voids are filled with concrete. The rough surface of the Durisol units allowed for direct application of the natural wall finishes both inside and outside the house. The wall material helps inform how the plasters will be applied. Metal or wood lath are needed to secure the finish to the framing or the surface of certain wall types.

Interior: Earthen Plaster

Inside, Catherine mixed bagged clay, sand, casein (milk protein), borax, and a bit of bleach to create her finish. The clay acts as the binder, holding the other components together. The sand is the "aggregate," like the pea gravel used in cement, adding volume and increasing strength. Casein is the key component in milk paints, which have been used for centuries. In the earthen plaster mix, casein acts as a binder. As a milk protein, casein adds microscopic reinforcement, increasing both the stability and strength of the plaster. Borax has a mild disinfectant quality and also appears to help harden the plaster (the natural plaster community is studying the mechanics of borax in plaster). The small amount of bleach is added as a precaution: casein can spoil, just like milk.

The interior walls receive a finish coat of potassium silicate (a mineral finish that bonds permanently with the silica in the plaster mix), casein glaze or alis-clay paint. This increases the water resistance and durability of the finish while still allowing the walls to "breathe." Pigments can be added to any of these finishes to create color effects on the surface.

The naturally occurring mica in the clay creates a subdued sparkle on the surface as the viewer's perspective shifts—a depth impossible to achieve with conventional paint-based finishes.

Exterior: Lime Plaster

Outside, the lime plaster finish consists of a binder (lime putty), a structural component (fine mason's sand) and a lot of pigment (iron oxide). Lime putty is the pudding-consistency result of adding water to hydrated lime powder (available at building supply stores as "Type S- or N-Hydrated Lime." The putty should soak for at least one week; multiple weeks or even months are even better.

Well-soaked lime putty is them mixed with aggregates (the structural component mentioned above) and other natural additives, and applied by hand or trowel in one to three coats to a well-prepared surface. It is then smoothed and burnished with a damp sponge.

The amount of pigment affects the strength of the plaster; large amounts of pigment must be balanced with the right amount of lime putty in order to maintain binding strength. In general, the proportion used on the finish coat is one part lime putty to three parts sand, plus iron oxide pigments.

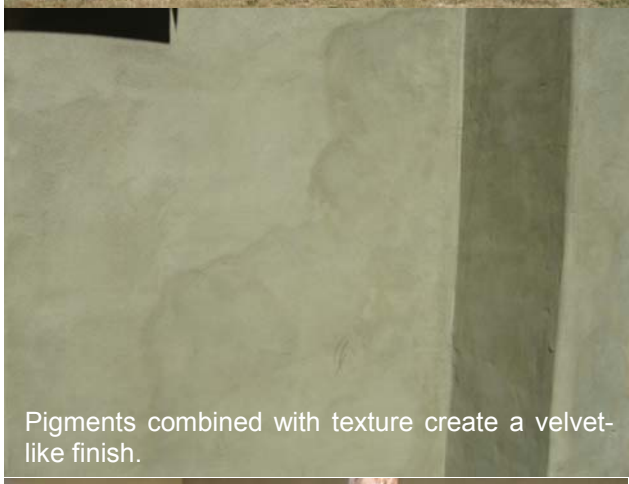
While curing, the surface must be misted to control drying. This helps reduce cracking, but more importantly, only in the presence of water can the calcium in the plaster reconnect to its long-lost limestone partner: carbon dioxide. Drying the walls as slowly as possible facilitates this chemical reaction. Given the proper curing time, lime plaster will return to a limestone state. Weather impacts drying time substantially. Dry winds and sunny days accelerate the drying process and can lead to excessive cracking. To help control the process, Catherine tarps the walls and mists them.

One of the major draws of natural finishes is the fact that they invite participation. The application takes skill and practice, but the owner can derive great satisfaction from knowing that the section of the kitchen over there is "their" wall. Engaging the owners in the process also helps ensure they're equipped with the skills to maintain and repair their wall surfaces and aren't reliant on specialists to keep their home in working order.

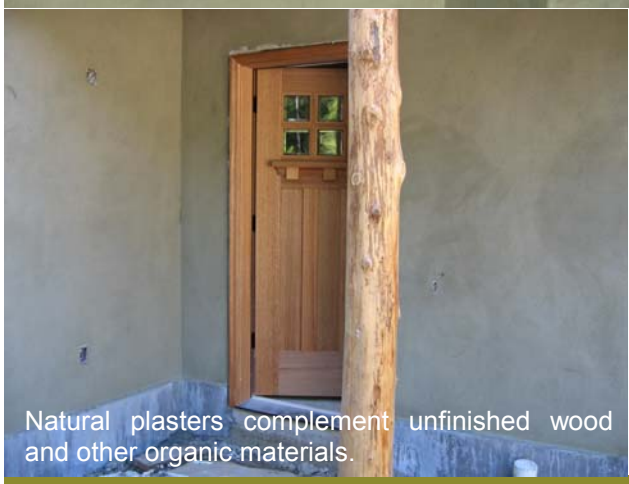
The Results

Athena Steen, natural finish expert, describes these types of finishes "a superior wall finish at a comparable price." The surface can yield cost savings over time, as maintenance often requires spot-repair rather than complete replacement. The owners not only received beautiful interior and exterior finishes that are nontoxic, durable and can return to the earth over time. They also helped support the ongoing development of a local trade: natural plastering. But the most apparent result is the tactile nature of the walls in the home. They invite close inspection, pondering, and have a grounded quality that is worlds apart from the hollow nature of gypsum wallboard.

Lime plaster skirts the first floor of the home.



Pigments combined with texture create a velvet-like finish.



Natural plasters complement unfinished wood and other organic materials.

For further information on this project:

> Catherine Burke:
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> Living Shelter Design:
www.livingshelter.com